

Claims

1. A method for the isolation of polysaccharides, wherein the following steps are carried out:
- (a) mixing of a bacterial polysaccharide fraction with a detergent solution;
 - (b) addition of alcohol to a final concentration which is below the concentration at which the polysaccharide precipitates;
 - (c) mixing the solution;
 - (d) filtering the solution;
 - (e) separation of the polysaccharide from detergent and alcohol.
2. The method of claim 1, wherein the alcohol is ethanol.
3. The method of claim 1 or 2, wherein the separation of the polysaccharide is carried out by the precipitation of the polysaccharide by adding more alcohol.
4. The method of any one of claims 1 to 3, wherein the polysaccharides stem from gram-negative bacteria.
5. The method of claim 4, wherein the gram-negative bacteria are bacteria of the genus Haemophilus, Neisseria, Klebsiella or Escherichia and in particular of the species Haemophilus influenzae (type b), Klebsiella pneumoniae, Neisseria meningitidis or Escherichia coli.
6. The method of any one of claims 1 to 5, wherein the detergent is an anionic surfactant.
7. The method of claim 6, wherein the anionic surfactant is an alkyl sulfate, for example sodium dodecyl sulfate (SDS).
8. The method of claim 6 or 7, wherein the surfactant concentration in the solution added to the polysaccharide fraction in step (a) is at the most 20% (w/w).

9. The method of claim 8, wherein the surfactant concentration in the polysaccharide solution is 0.1 % to 4 % (final concentration, w/w).
10. The method of any one of claims 1 to 9, wherein in step (b) the alcohol is added to the solution to a final concentration which is approximately 10 % below the concentration at which the polysaccharide precipitates.
11. The method of any one of claims 1 to 10, wherein the initial concentration of polysaccharides in the polysaccharide fraction is greater than 10 mg/ml.
12. The method of any one of claims 1 to 11, wherein the filtration is carried out by means of a polymer filter.
13. The method of any one of claims 1 to 12, wherein the filtration is carried out by means of a deep bed filter.
14. The method of claim 12 or 13, wherein the polymer filter and/or the deep bed filter is a polypropylene filter.
15. A polysaccharide vaccine comprising a polysaccharide isolated according to the method of any one of claims 1 to 14 and, optionally, a pharmaceutically acceptable carrier.
16. The polysaccharide vaccine of claim 15 for the prophylaxis against meningitis, epiglottitis, otitis media, pneumonia, arthritis, sepsis, nosocomial infections, urinary tract infections or gastroenteritis.
17. A conjugate comprising a polysaccharide isolated according to the method of any one of claims 1 to 14 and a pharmaceutically acceptable protein chemically connected therewith.

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18. A conjugate vaccine comprising a polysaccharide isolated according to the method of any one of claims 1 to 14 and a pharmaceutically acceptable protein chemically connected therewith.

19. A combination vaccine comprising a polysaccharide isolated according to the method of any one of claims 1 to 14 or a conjugate of claim 17 as well as at least one further immunogenic component.

20. The combination vaccine of claim 19, wherein the additional immunogenic component is a diphtheria, tetanus, pertussis, hepatitis B or poliomyelitis antigen.

21. Use of a polysaccharide isolated according to the method of any one of claims 1 to 14 as intermediate product for the production of a conjugate or combination vaccine.

22. The use of claim 20, wherein the conjugate or combination vaccine comprises as an active component a conjugate comprising a polysaccharide isolated according to the method of any one of claims 1 to 14 and a pharmaceutically acceptable protein chemically connected therewith.

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A

add
B, B₁, B₂